

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A process for removing DOC from a concentrated salt solution containing DOC, said process comprising:
 - 5 (i) contacting the salt solution with a coagulant and/or flocculant such that the DOC becomes insoluble in the salt solution; and
 - (ii) removing the insoluble DOC from the salt solution.
2. A process according to claim 1 wherein the concentrated salt solution containing 10 DOC is a solution produced as a by-product from regenerating ion-exchange resin which have been previously used to remove DOC from raw water.
3. An industrial scale process for the removal of DOC from water containing DOC, said process comprising:
 - 15 (i) contacting the water with ion-exchange resin to enable adsorption of DOC on the resin;
 - (ii) separating the resin loaded with DOC from the water;
 - (iii) regenerating at least a portion of the separated resin by contacting it with a concentrated salt solution containing a source of anions such that the anions exchange with DOC adsorbed on the resin;
 - 20 (iv) separating the regenerated resin from the concentrated salt solution containing DOC;
 - (v) contacting the solution from step (iv) with a coagulant and/or flocculant such that the DOC becomes insoluble in the salt solution; and
 - (vi) removing insoluble DOC from the salt solution.
4. A process according to claim 3 wherein the ion exchange resin has a density greater than the water and the resin loaded with DOC is separated from the water by settling.
- 30 5. A process according to claim 4 wherein the settled resin is collected by vacuum collection.

6. A process according to claim 3 wherein the regenerated resin is separated from the concentrated salt solution containing DOC by filtering through a mesh of appropriate porosity.

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7. An industrial scale process for the removal of DOC from water containing DOC, said process comprising:

- (i) contacting the water with ion-exchange resin to enable adsorption of DOC on the resin;
- 10 (ii) separating the resin loaded with DOC from the water;
- (iii) regenerating at least a portion of the separated resin and recycling the remainder to step (i), wherein the resin is regenerated by contacting it with a concentrated salt solution containing a source of anions such that the anions exchange with the DOC adsorbed on the resin;
- 15 (iv) separating the regenerated resin from the concentrated salt solution containing DOC;
- (v) recycling the regenerated resin back to step (i);
- (vi) contacting the separated salt solution from step (iv) with a coagulant and/or flocculant such that the DOC becomes insoluble in the salt solution;
- 20 (vii) removing insoluble DOC from the salt solution to regenerate concentrated salt solution; and
- (viii) recycling concentrated salt solution back to step (iii).

8. A process according to claim 3 or claim 7 which is used in the treatment of a raw water source to produce potable water for distribution and consumption.

25 9. A process according to claim 7 wherein the regenerated concentrated salt solution obtained from step (vii) is treated with a base.

30 10. A process according to claim 7 wherein the regenerated concentrated salt solution obtained from step (vii) has a pH of 7-11.

11. A process according to any one of claims 2 to 10 wherein the ion-exchange resin is magnetic ion-exchange resin.
- 5 12. A process according to claim 11 wherein the magnetic ion-exchange resin is MIEX® resin.
- 10 13. A process according to any one of claims 1, 3 or 7 wherein the coagulant/focculant is selected from aluminium sulphate (alum), polyaluminium chloride, aluminium chlorohydrate, polyaluminium chlorohydrate, ferric chloride, ferric sulphate, polymerised ferric sulfate, polyDADMACS, polyacrylamide emulsion polymers, coagulant aids, and filter aids.
- 15 14. A process according to claim 13 wherein the focculant/coagulant is selected from Ferric chloride, Ferric sulphate, polymerised Ferric sulphate and Aluminium sulphate (Alum).
- 20 15. A process according to any one of claim 1, 3 or 7 wherein the concentrated salt solution is a concentrated inorganic salt solution selected from NaCl, KCl, NH₄Cl, CaCl₂ and MgCl₂ or mixtures thereof.
- 25 16. A process according to claim 15 wherein the concentrated salt solution is a brine solution.
- 30 17. A process according to claim 15 or claim 16 wherein the salt solution has a concentration of greater than 1.5M, or 100 grams of total dissolved salt in a mixture of salts per litre of water.
18. A process according to any one of claims 1, 3 or 7 wherein the step of contacting the salt solution with a coagulant and/or flocculant is conducted under acidic conditions.

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19. A process according to claim 18 wherein the pH is less than 3.

20. A process according to any one of claims 1 to 17 wherein the step of contacting the salt solution with a coagulant and/or flocculant further includes the addition of an acid.

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21. A process according to claim 20 wherein the acid is selected from HCl, HNO₃ and H₂SO₄.

22. A process according to claim 21 wherein the acid is HCl.

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23. A process according to any one of claims 20 to 22 wherein the pH is about 2.

24. A process according to any one of claims 1 to 23 wherein the insoluble DOC is removed from the salt solution by filtration.

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25. A process according to claim 24 wherein the filtration method is a plate and frame filter process.

20 26. A process according to any one of claims 1 to 25 wherein the DOC which is removed from the salt solution is used as a fertiliser, feed-stock, soil conditioner, or health supplement.

27. A process according to any one of claims 1 to 25 wherein the DOC which is removed from the salt solution is used as land fill.

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Orica Australia Pty Ltd

30 By DAVIES COLLISON CAVE
Patent Attorneys for the Applicants